

**Translation**

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>04P534WO-UCY</b>	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. <b>PCT/JP2004/010275</b>	International filing date (day/month/year) <b>13.07.2004</b>	Priority date (day/month/year) <b>17.07.2003</b>
International Patent Classification (IPC) or national classification and IPC <b>H01L29/786, 29/06, 51/00</b>		
Applicant <b>MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.</b>		

1.	This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2.	This REPORT consists of a total of <u>6</u> sheets, including this cover sheet.
3.	This report is also accompanied by ANNEXES, comprising: <ul style="list-style-type: none"> <li>a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>4</u> sheets, as follows:             <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</li> <li><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</li> </ul> </li> <li>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</li> </ul>
4.	This report contains indications relating to the following items: <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Box No. I Basis of the report</li> <li><input type="checkbox"/> Box No. II Priority</li> <li><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li><input type="checkbox"/> Box No. IV Lack of unity of invention</li> <li><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li><input type="checkbox"/> Box No. VI Certain documents cited</li> <li><input type="checkbox"/> Box No. VII Certain defects in the international application</li> <li><input type="checkbox"/> Box No. VIII Certain observations on the international application</li> </ul>

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/JP	Authorized officer
Facsimile No.	Telephone No.

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Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This report is based on translations from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of:
    - ☐ international search (Rule 12.3 and 23.1(b))
    - ☐ publication of the international application (Rule 12.4)
    - ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):
  - ☐ the international application as originally filed/furnished
  - ☒ the description:
    - pages 1-31 as originally filed/furnished
    - pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
    - pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
  - ☒ the claims:
    - nos. 4-5, 8, 10, 14, 22-23 as originally filed/furnished
    - nos.\* \_\_\_\_\_ as amended (together with any statement) under Article 19
    - nos.\* 3, 6-7, 9, 11-13, 19-21, 24-26, 28 received by this Authority on 26.04.2005
    - nos.\* 2 received by this Authority on 26.08.2005
  - ☒ the drawings:
    - sheets Fig. 1-15 as originally filed/furnished
    - sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
    - sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
  - ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☒ The amendments have resulted in the cancellation of:
  - ☐ the description, pages \_\_\_\_\_
  - ☒ the claims, nos. 1, 15-18, 27
  - ☐ the drawings, sheets/figs \_\_\_\_\_
  - ☐ the sequence listing (*specify*): \_\_\_\_\_
  - ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
  - ☐ the description, pages \_\_\_\_\_
  - ☐ the claims, nos. \_\_\_\_\_
  - ☐ the drawings, sheets/figs \_\_\_\_\_
  - ☐ the sequence listing (*specify*): \_\_\_\_\_
  - ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	2-14, 19-26, 28	YES
	Claims		NO
Inventive step (IS)	Claims	2-14, 19-26	YES
	Claims	28	NO
Industrial applicability (IA)	Claims	2-14, 19-26, 28	YES
	Claims		NO
2. Citations and explanations (Rule 70.7)			
Document 1:	JP 2002-82082 A (Matsushita Refrigeration Co., Ltd.), 22 March 2002; paragraphs [0003], [0029] and [0055]-[0119]		
Document 2:	JP 2002-273741 A (Polymatech Co., Ltd.), 25 September 2002; paragraphs [0012] and [0043]-[0058]		
Document 3:	JP 6-273811 A (Mitsubishi Electric Corp.), 30 September 1994; paragraphs [0011], [0027], [0031] and [0042]-[0074]		
Document 4:	WO 2002/080195 A1 (E. I. Dupont de Nemours and Co.), 10 October 2002; page 2, lines 25-38		
Document 5:	WP 2003/016599 A1 (Asahi Kasei Corp.), 27 February 2003; page 9, line 46		
Claim 2	<p>The invention set forth in claim 2 involves an inventive step relative to documents 1 to 4, cited in the international search report, and document 5 above.</p> <p>Documents 1 to 5 do not disclose "composite materials which include an organic semiconductor material and nanotubes, wherein the circumferences of the individual nanotubes are coated with the organic</p>		

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semiconductor material, and the percentage of nanotubes in the mixture as a cumulative percentage relative to the organic semiconductor layer as a whole is 30-90%"; and such materials could not be conceived easily by a person skilled in the art.

## Claims 3-5

The inventions set forth in claims 3 to 5 involve an inventive step relative to documents 1 to 4, cited in the international search report, and document 5 above.

Documents 1 to 5 do not disclose "composite materials which include an organic semiconductor material and nanotubes, wherein the nanotubes are connected in pluralities thereof"; and such materials could not be conceived easily by a person skilled in the art.

## Claims 6-14 and 24-26

The inventions set forth in claims 6 to 14 and 24 to 26 involve an inventive step relative to documents 1 to 4, cited in the international search report, and document 5 above.

Documents 1 to 5 do not disclose "composite materials which include an organic semiconductor material and nanotubes, wherein the circumferences of the individual nanotubes are coated with the organic semiconductor material, and the percentage of nanotubes in the mixture as a cumulative percentage relative to the organic semiconductor layer as a whole is 30-90%" or composite materials which include an organic semiconductor material and nanotubes, wherein the nanotubes are connected in pluralities thereof"; and such materials could not be conceived easily by a person skilled in the

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art.

#### Claims 19 to 20

The inventions set forth in claims 19 to 20 are novel and involve an inventive step relative to documents 1 to 4, cited in the international search report, and document 5 above.

None of documents 1 to 5 discloses a method for producing the semiconductor layer of a field effect transistor by repeating the process of immersing nanotubes in a solution of an organic semiconductor material and filtering; and such a method is not obvious to a person skilled in the art.

#### Claims 21 to 23

The inventions set forth in claims 21 to 23 are novel and involve an inventive step relative to documents 1 to 4, cited in the international search report, and document 5 above.

None of documents 1 to 5 discloses a constitution wherein the nanotubes mixed with an organic semiconductor material to constitute the semiconductor layer of a field effect transistor are connected in pluralities thereof; and such a constitution is not obvious to a person skilled in the art.

#### Claim 28

The invention set forth in claim 28 does not involve an inventive step in the light of document 1, cited in the international search report, and document 5 above.

Using spraying of a solution of the material for forming a polymeric organic semiconductor material on a

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substrate is known art, as disclosed in document 5, and a person skilled in the art could easily conceive of spraying a solution of the material when carrying out the invention disclosed in document 1.